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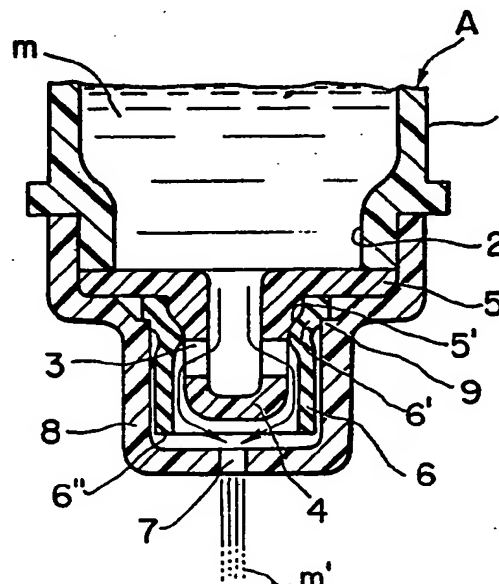
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(54) Valve and container for medical liquids

(57) A medical liquid container comprises a container body (1) for containing medical liquids (m) and is made of synthetic resin or the like. Said container includes a valve having an inner cap (5) attached to an opening (2) of container body (1) and has a hollow cap-like portion (4) provided with through-holes (3) in the side wall thereof. A tube (6) of resilient material is sealingly fitted

onto the hollow cap-like portion (4) to normally close the through-holes (3), and an outer cap (8) is arranged outside tube (6) and has a shoulder portion (9) for fixedly locating tube (6) onto the base of the inner cap, the outer cap (8) being provided with a through-hole through which medical liquid is released. As shown, tube (6) has lifted off portion (4) in response to squeezing of container body (1). Initially outer cap (8) is sealed by a break-off portion (10), Fig 2 (not shown).

FIG. 3



GB 2 106 480 A

FIG. 1

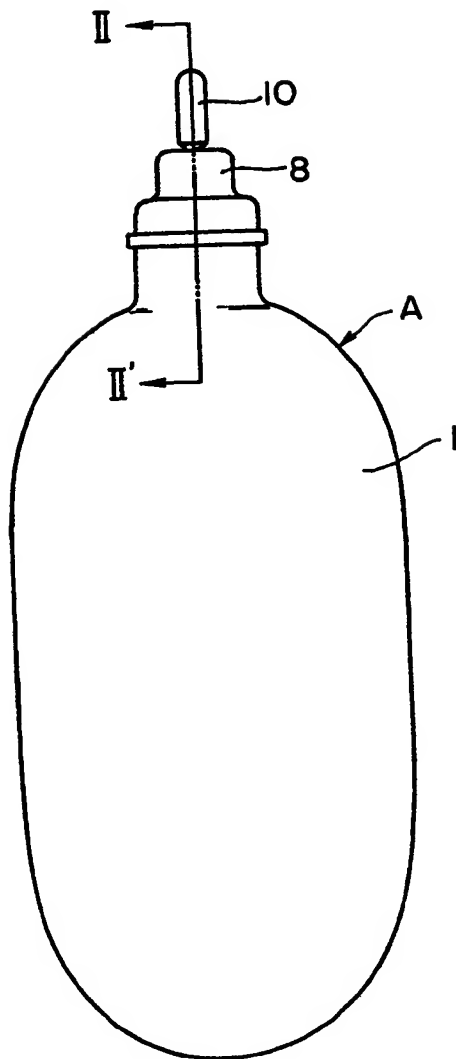


FIG. 2

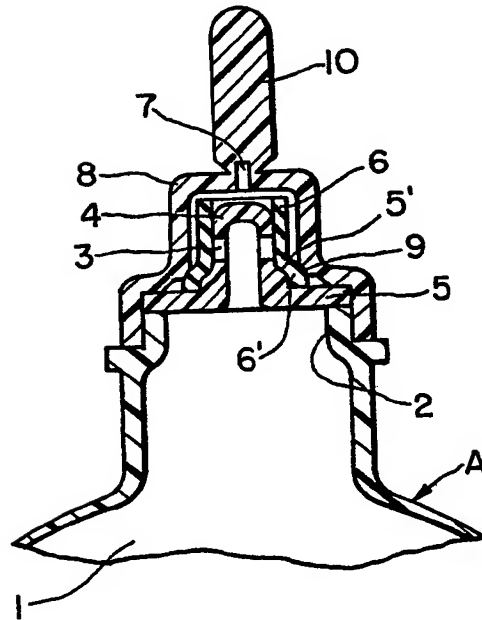
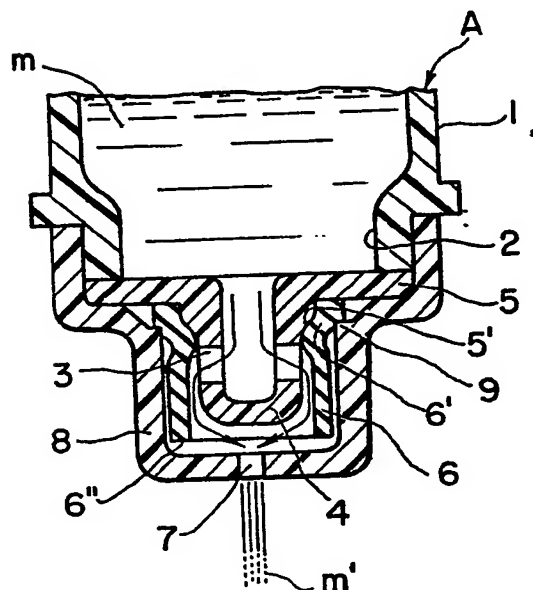


FIG. 3



SPECIFICATION

Container for containing medical liquids

The present invention relates to a squeeze-to-use container for dispensing medical liquids and, more particularly, to a container of simple and efficient construction, which is capable of preventing liquid once expressed from the container from flowing backwardly into the container again to contaminate the same.

An important feature of a squeeze-to-use container which contains a medical liquid and which is squeezed to obtain a desired amount of medical liquid, is that it is so sealed as to prevent medical liquid contained from leaking even when it is left in whatever posture and that it has a construction such that medical liquid once expressed from the container cannot flow backwardly into the container to contaminate medical liquid contained therein. One of these conventional containers has a valve body arranged at the opening of container which is formed of two pieces of thin resilient film contacted with each other to usually close the opening of container. When the container is pressed, these two pieces are opened by pressure inside the container to form a jet of liquid from the container. When the squeezing of the container ceases however, the two pieces of film again contact each other to close the opening of the container. This valve body is a molded unit or is composed of two different films in contact and many points are left to be improved from the viewpoint of function and cost reduction as a part of container.

According to the present invention therefore there is provided a valve for a squeeze-to-use fluid container, said valve comprising an inner cap securable to the neck of the container and including a hollow upstanding portion including a dispensing aperture therein, and a resilient obturating member disposed about said upstanding portion to reversably obturate said dispensing aperture, the arrangement being such that the obturating member will flex from the upstanding portion to allow fluid to pass through the aperture at a predetermined fluid pressure, but firmly seals said aperture below said predetermined pressure.

An object of the present invention is therefore to provide a squeeze-to-use container for containing a medical liquid and capable of preventing medical liquid contained from reentering the container after expression.

Another object of the present invention is to provide a container for containing a medical liquid therein and wherein when medical liquid contained is released outside the container, the released liquid flows gently to its target, thus allowing cleaning due to releasing liquid or injection thereof to be smoothly achieved.

One embodiment of the invention will now be described, by way of illustration only with reference to the accompanying drawings.

Figure 1 is a front view showing an example of a medical liquid containing a container according

to the present invention;

Figure 2 is an enlarged sectional view taken along a line II—II' in Figure 1; and

Figure 3 is a sectional view similar to Figure 2 and showing the container when medical liquid contained therein is released from the container shown in Figure 1.

A preferred example of container according to the present invention will now be described in detail with reference to the accompanying drawings.

As shown in Figures 1 and 2, a medical liquid container (A) according to the present invention comprises a container (1) for containing a medical liquid, made of synthetic resin or the like, having a thin wall and a comparatively large resilience. An inner cap (5) is attached to an opening (2) of container (1) and has an upwardly extending hollow cap-like portion (4) provided with through-holes (3) in the side wall thereof. A rubber pipe (6) is sealingly fitted onto the cap-like portion (4), and an outer cap (8) is arranged outside the rubber pipe (6) and has at its inner lower portion thereof a shoulder portion (9) which clamps and thereby fixes the inner lower portion (6') of rubber pipe (6) onto the base portion (5') of the inner cap (5). The outer cap (8) also has in the centre of the top wall thereof a through-hole (7) through which medical liquid is released outside. A breakable portion (10) projects from about the centre of top wall of outer cap (8) adjacent the through-hole (7); said breakable portion (10) being snapped off in order to use the container by exposing hole (7). The rubber pipe (6) employed is made of a commercially available resilient material having a predetermined diameter, and is used as a piece cut off from a long tube to a required length. This is extremely cheap. In addition, the operation of fixing this piece of rubber pipe (6) to the cap-like portion (4) can be easily attained by fitting it onto the cap-like portion (4) using the resiliency of the material selected. Therefore, the medical liquid container (A) according to the present invention can reduce its cost substantially.

When the wall of container (1), in which a medical liquid (m) such as contact lens cleaning liquid or enema liquid, for example, is contained, is squeezed the medical liquid inside is released through holes (3) formed in the side wall of cap-like portion (4) of inner cap (5). By virtue of the squeezing pressure the liquid is then forced between the cap-like portion (4) and the rubber pipe (6) to make paths therebetween to the outer end (6'') of rubber cap (6), and thence to the through-hole (7) of outer cap (8) to a target, as shown in Figure 3.

This released liquid (m') is not released in a straight stream from the container (1), but because forced through holes (3) and then directed to the through-hole (7) along the side of cap-like portion (4) resisting the inward force of rubber pipe (6), the force of the released liquid is reduced to a minimal value, thus allowing cleaning due to releasing liquid or injection of releasing liquid into the target to be smoothly and gently

achieved.

In order to prevent impure atmosphere or released medical liquid from entering the container to contaminate medical liquid contained therein the container body may be made of a material which is slowly restored to its original shape.

CLAIMS

- 10 1. A valve for a squeeze-to-use fluid container, said valve comprising an inner cap securable to the neck of the container and including a hollow upstanding portion including a dispensing aperture therein, and a resilient obturating member disposed about said upstanding portion to reversably obturate said dispensing aperture, the arrangement being such that the obturating member will flex from the upstanding portion to allow fluid to pass through the aperture at a predetermined fluid pressure, but firmly seals said aperture below said predetermined pressure.
- 20 2. A valve according to Claim 1 wherein an outer cap is secured about said inner cap and obturating member, said outer cap being provided with a nozzle.
- 25 3. A valve according to Claim 2 wherein the nozzle is closed by a readily breakable projection formed with said cap, said projection being removed prior to the first use of said valve.
4. A valve according to any preceding claim

30 wherein the upstanding portion is at least substantially cylindrical and the dispensing aperture is substantially perpendicular to the axis of said upstanding portion, said obturating member being formed of a resilient tubular plastics material.

35 5. A valve according to any one of Claims 2 to 4 wherein an inner surface of the outer cap cooperates with an outer surface portion of the upstanding portion to lock the resilient obturating member into its desired position

40 6. A squeeze-to-use container including a valve as claimed in any preceding claim.

7. A method for the sterile dispensing of a medical liquid which includes utilizing a valve or an assembly of a valve and squeeze-to-use container as claimed respectively in Claim 1 to 5 or 6.

8. A valve substantially as hereinbefore set forth.

9. A valve substantially as hereinbefore set forth with reference to and/or as illustrated in Figures 1 to 3 of the accompanying drawings.

10. A squeeze-to-use container and valve assembly substantially as hereinbefore set forth.

11. A squeeze-to-use container and valve assembly substantially as hereinbefore set forth with reference to and/or as illustrated in Figures 1 to 3 of the accompanying drawings.